Meeting Date: 24-October-2002

<u>Australia:</u> M. Kesteven <u>USA:</u> D. Kubo, M.T. Chen, J. Peterson, T. Huang, K. Lin, J. Han, C.T. Li, W. Wilson <u>Taiwan:</u> H.M. Jiang, P. Shaw, P. Ho, C.J Ma, E. Hwang, J. Lim, W. Ho, H. Wang

Minute Recorder: D. Kubo comments from this week, previous weeks comments

I.<u>New Action Items:</u>

23oct02-1: Enclosure Sizes >> Derek/CT: Ted requested the external box sizes for weather tight enclosures which mount on the platform.

<u>23oct02-2:</u> Clock Drive Motor >> Ted/Ferdinand: Ted to characterize the torque for the clock drive shaft with the mount loaded. Thereafter, identify and order a motor.

Jeremy mentioned that a number of tests listed in schedule make use of a motorized drive. He asked whether plans are being made to perform motorized tests before beginning the build of the production hardware. Jeff P. believed we will do this.

II. Previous Action Items (still open):

03oct02-1: Site Clock >> Bob, Ferdinand: Identify and order site clock.

e-mail from Ferdinand on 10/21/02 Hi Bob, I have requested quotes from different vendors for the GPS clock for MLO. The standard specification are the following: 1 pps, IRIG-B, 10 MHz sine wave and Network time server. This is what I have found and my comments: 1.) True Time, Model: XLi, 1U chassis with 4 option slots: \$ 3,300.00 - GPS Engine with 50 feet cable: \$ 975.00 - 1, 5, 10 MHZ sine wave output: \$ 725.00 - times 4 IRIG and Multi code board: \$ 985.00 - Network time server: \$ 1,000.00 a total of: \$ 6.985 The unit could be easy be upgraded by adding other optiosn as needed (low phase noise oscillator or multi frequency output). one more slots is free after the minimum configuration. Also the network time server option is part of the unit and does not need to require a slot or a separate box. This model would be my preference. If you need more information, check there web site: http://www.truetime.com/indexhome.html 2.) Zyfer, Model: GSync 391, a total of : \$ 8,192.85 - same as above plus a 10 MHz sine wave OCXO Avery similar design as the XLi but the finish is not that good. Also more expensive for unknown reasons. Former DATUM company. http://www.zyfer.com/products/gsync%20061802.pdf 3.) ESE GPS Master clock, Model: ES-185AK and NTP Server: ES-299 - same as above but no upgrade possibilities. We need two units to cover our needs. - ES-185AK: \$ 2,795.00 - ES-299: \$ 1,995.00 total of: \$ 4,790.00 Not the same quality as the Zyfer or the True Time. The major disadvantage is, that the ES-185AK is not upgradable. I have also my concerns about the performance and reliability. Not my preference. http://www.ese-web.com/

Any comments and should I go and order the XLi from True Time? Cheers Ferdinand

03oct02-3: Test Schedule >> Bob: Expand schedule to include retrofitting of the following: new version 2 receiver, 4-lag correlators, 60 cm dishes, new DC amplifier and readout boards.

Awaiting Bob's return on November 4.

III.Closed Action Items (as of this meeting):

<u>16oct02-1: Switching Power Supplies >> Homin: to find a switching power supply</u> and run a quick test to see how much the regulator suppresses the power supply noise. Jeff suggest to use a 12V supply from a PC which is typically very noisy. Measurement should initially be done with an oscilloscope, should easily be able to see 10 mV of switching noise.

e-mail sent by Homin on 10/22/02: I did some measurement on the 7805 regulator by the oscilloscope, unfortunately, I can't see any significant noise rejection by that regulator. I tried computer power supply and a 12V switching power supply, also tried 2 kind of Oscilloscopes, digital and analog, the only improvement I can see is about 2 mV RMS less after regulator, average at 20mv RMS on the digital O-scope. I will resume the test after dynamic signal analyzer available. cheers Homin Jiang(**江宏明**), homin@asiaa.sinica.edu.tw <u>http://www.asiaa.sinica.edu.tw/homin/</u>

16oct02-2: Low Dropout Regulators >> Derek: Homin asked Derek to look at regulators and select a standard one for all of use (where appropriate). Ferdinand suggested some LDO regulators to look at.

e-mail sent by Derek on 10/23/02: Dear Homin, As per Ferdinand's suggestion, I took a look a National's line of low drop out (LDO) regulators. Their regulator link is at:

http://www.national.com/catalog/AnalogRegulators.html

It turns out that the higher current regulators still have a fairly high dropout voltage. For instance the LM1084, http://www.national.com/ds/LM/LM1084.pdf , is a fixed voltage (+3.3, +5.0 or +12V) which can regulate up to 5.0A but has a spec dropout of 1.5V at full load (1.3V typical). I would use the TO-220 package. Unit price is \$2.14 each at DigiKey.

I am planning to use the LM1084IT-12 part for the 1^{st} Section plug-in Eurocards and the 2^{nd} Section IF plate assemblies. The 1^{st} section plug-ins will power only a single Celeritek amp which requires +12V @ 0.62A. I will have one regulator per plug-in module. For the 2^{nd} section plates, we will have 6 Celeritek amps @ 0.620A each, for a total of 3.72A. I might want to use 2 regulators per plate assembly to stay well below the 5.0A spec of the regulator. Half of these plates also need to supply +12V @ 0.440A for the Dow-Key SPDT switches, however, the switches are latching so there will only be a momentary current draw when the switches are thrown. I will probably use a 3rd regulator to power to these switches separately just in case something goes wrong with the backlash protection within the switches (don't want any chance of damaging the expensive Celeritek amps).

The Correlator system uses a number of voltages which include: +12.0, +6.0, +5.0, +3.3, +1.65, +1.3, -1.0, and -5.0V. The current requirements vary quite widely depending on the consuming device and we have some unique packaging requirements. So I think I will select the individual regulators on a case by case basis.

Regards, Derek

<u>16oct02-3: ML Network</u> >> Derek: Ming-Tang asked Derek to see if we can get a mail router working at the summit so that he can send e-mails from there.

Darryl needs to do some work to establish a DCHP server for us (we are back to a manual IP connection) and will try to setup a mail server for us as well. In the meantime Ming-Tang identified the following working outgoing mail server (SMTP):

mail.cmdl.noaa.gov

<u>12sept02-1:</u> DC Power Routing on Platform >> Homin, Derek: Generate a spreadsheet of DC voltages and current necessary for each box.

e-mail from Derek on 10/23/02

Dear Homin, I updated the Correlator Excel spreadsheet (see attached) and tabulated the numbers below along with your previous RCVR and IF/LO numbers from 9/19/02. This is for the 13element system (A=analog, D=digital):

	2.0	5.9	41.6	68.0	17.4	57.7	34.5	3.3A
CORR	0.0	0.0	41.6	68.0	9.6	57.7	0.0	0.0
IF/LO	0.0	2.6	0.0	0.0	3.9	0.0	32.5	0.0
RCVR	2.0	3.3	0.0	0.0	3.9	0.0	2.0	3.3
	-18A	-18D	- 8 A	+8A	+8D	+16A	+18A	+18D

Max current is still pretty high at 68A for the +8V supply but this is much better than the 98A we had calculated last month. Stranded 6 AWG wire (conductor diam = 4.67mm) has a resistance of 0.4105 Ohms/1000ft. I'm guessing for now that our DC cable hamess will be 20m (65.6ft) long which puts the round trip resistance at 0.0539 Ohms. If we used 4 wires in parallel the resistance will drop to 0.0135 Ohms which translates to a voltage drop of (0.0135)*(68A) = 0.92V. This sounds do-able to me. For the 19-element system, we can leave the 13-element hardware in place and add more power supplies and wiring to accommodate the additional hardware. Derek Kubo

12sept02-5: 60 cm Dish >> Ted, Philippe: Prepare contract to Dr. Ong.

Paul Shaw - contract was signed yesterday. Estimated delivery of dishes by end of January 2003.

<u>20sept02-2: Platform/Mount</u> >> Bob: Mike and Bob had some discussions about the calibration for the base. It was suggested that Bob begin a dialog with Vertex regarding this issue. It was also suggested to generate an interface document describing the drive of 3 rotational axis (look at draft interface doc from ALMA). This all has to be ironed out before the CDR on December 10th in Taipei.

I dropped this AI because it's rather vague as to what is being asked. We can start a new and more specific AI during the next meeting.

IV. Miscellaneous Discussions:

ML Prototype: Ming-Tang summarized the prototype status at the summit:

- Receiver, LO, and correlator boxes are installed on the mount.
- Correlator PC is now working and has been installed in the outdoor rack.

- Monitor PC is installed in the dome and the connection to the correlator pc looks good.
- Plan to install the translation table and noise source onto the mount and look for fringes while the receiver is warm at ambient temperature.
- 3-phase power has been installed with 2 15A breakers. Will attempt to do a cool down test later.
- Ted mechanical balance of the mount/platform looks good. Ted is still using some counterweights held in place by some C-clamps. He will measure the clock drive torque in a few days.
- Dishes and optical telescope will be mounted after the noise source tests are completed (translation table must be removed before dishes/optical telescope can be mounted).
- Astronomical tests on moon.

MMIC: No discussion.

Receiver: .. See discussion above.

LO/IF: No discussion.

<u>Correlator:</u> Derek - 2 packaged mixers delayed until October 28. This doesn't hurt us because CT won't be in Taipei to test it (he will still be in Hilo). 2 4-lag correlator modules delayed until November 15.

Dishes: No discussion.

<u>Platform/Mount:</u> Paul S. - Paul is proceeding with the paper work for the CMA contract for the platform. Estimated installation date on ML is August 2003.

Site Issues/Network: See AI "16oct02-3" discussion above.

Hilo Facilities: No discussion.

Schedule: No discussion.

V.Other Inputs: